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6. "On the Temperature of Steam, and its corresponding Pressure." By John Curr, Esq. Communicated by J. Scott Russell, Esq., F.R.S.

In this paper, which is a continuation of a former paper bearing the same title, the author states that the law given in that paper, in reference to steam when superincumbent on the water in the boiler, may be rendered applicable to the determination of its pressure when insulated therefrom, as in the case of the expansive engine, of which the cylinder being in part filled with steam of the same temperature as that in the boiler, the communication is suddenly cut off, and the stroke is completed by the pressure on the piston of the steam whilst expanding within the cylinder. He considers that the power of expansive engines has been greatly overrated, instancing those of the Great Britain, which were of the estimated power of 1200 horses, but which he states he can prove did not exceed in actual power that of 300 horses. This he attributes to the inapplicability of Mariotte's law without a particular limitation. Having premised that "it is assumed that, by nature's law in the generation of steam, of the temperature 100° and of a pressure of 15 lbs. on a square inch, the density of the Matter of Heat, is to that of atmospheric air of the same temperature and pressure exactly as 1 to 2," he then gives general laws, by means of which, he considers, the pressure of steam when cut off from its generating source may be correctly estimated.

"In conclusion," the author states, "it may be said that, this and the former paper, both professing to give laws relative to the pressure and temperature of steam, *independently of experiment*, the theories proposed must in general be accepted as absolute truths, in case of being verified by experiment, or taken as vain attempts to subvert laws already firmly or sufficiently established."

7. "An Experimental Inquiry into the strength of Wrought Iron Plates and riveted Joints as applied to Ship-building." By William Fairbairn, Esq., F.R.S.

The object of the author was to determine by direct experiment the strength and value of rolled iron plates and bars of different forms in reference to their application to ship-building, and the construction of other vessels exposed to severe strain.

The experiments described in this paper were conducted with great care, and the irons used were purposely selected from those districts where the largest quantities were manufactured. The relative strengths of each kind, as also the deductions, are given in the order in which the experiments were made.

The author found the tensile strength of plates, when torn asunder in the direction of the fibre, and when torn asunder across the fibre, as nearly as possible the same. This fact is derived from twenty distinct experiments, and he attributes this equality to the improved method of manufacture which of late years has been introduced. This new system is described as rendering the plate more uniform by crossing the layers in the process of 'piling,' thus forming an alternate series of laminæ, whose fibres cross each other in the body of the plate.